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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/820,693	03/30/2001	Robert J. O'Donnell	015290-509	5643

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EXAMINER	
KACKAR, RAM N	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/820,693	O'DONNELL ET AL.	
	Examiner	Art Unit	
	Ram N Kackar	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,14-19,24-35 and 37-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,14-19,24-35 and 37-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 40 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance the intermediate layer is claimed under the ceramic layer while the specification says that the intermediate layer is above the cerium oxide containing ceramic coating.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 11, 14-19, 24-35, 37, 39-40, 43, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuomiko Itou (JP 10004083) in view of Ravi Rungta (US 5362335) and Bamberg et al (US5721057).

Yuomiko Itou disclose Cerium oxide coating on the inside of a plasma chamber, clamp ring or shield ring etc (Abstract). Yuomiko Itou also teaches that the part could be a film or a compound (Abstract).

Yuomiko Itou does not disclose the parts having aluminum over which cerium oxide layer is disposed. Yuomiko Itou teaches that the parts could also be made of an oxide of ceramic (Abstract)

Ravi Rungta discloses corrosion-resistant barrier coating of one or more types of cerium oxide on aluminum alloy and teaches that the corrosion resistance is superior to that of aluminum oxide (Abstract, Col 1 lines 23 to Col 2 line 32 and Col 3 line 41) and intermediate layers for other coating materials (Col 4 lines 34-37). Ravi Rungta teaches that other rare earth oxides of lanthanum, yittrium and scandium also provide corrosion resistant coatings.

Since, plasma chambers and many other parts used in semiconductor manufacturing are frequently made of aluminum or aluminum oxide and may also have anodized coating for corrosion resistance, it would have been obvious for one of ordinary skill in the art at the time invention was made to have a cerium oxide coating on the inside of the chamber or other process chamber parts to have better corrosion resistance.

Yuomiko Itou or Ravi Rungta do not disclose cerium oxide film thickness.

Bamberg et al disclose Cerium oxide containing coating of metal parts exposed to high temperature and gases (Col 1 lines 8-22, line 64, Col 2 lines 1-8, 54-55 and example 1,2 and 4). The layer thickness is disclosed to be 0.4 mm (Col 3 lines 27-28).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use neither too thick for peeling off nor too thin for inadequate protection.

5. Claims 11, 14, 16-19, 24-29, 31-35, 37, 39, 42- 43, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al (US 6447636) in view of Han et al (US6123791).

Qian et al disclose parts of a plasma process chamber for semiconductor manufacturing made of aluminum or ceramic like aluminum oxide combined with an oxide of Group IIIB metal like cerium (Col 2 lines 34-40 and Col 6 lines 2-53).

Qian et al do not disclose relative proportion of aluminum oxide to Group III element oxide and do not disclose that the parts could be bulk parts.

Han et al disclose a process kit for high-density plasma semiconductor manufacturing (Col 1 lines 2-20 and Col 2 lines 1-55) having a composition of aluminum oxide ceramic and Group III oxide and disclose that the proportion could be 70% (Col 2 lines 41-55). Han et al teach that the group III oxide based bulk part could be made by sintering (Col 6 lines 7-11).

Therefore it is obvious that the combination could be either a coating or a bulk part of ceramic containing Group IIIB metal oxide and may have different proportion as per optimization.

6. Claims 38, 41, 44 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuomiko Itou (JP 10004083) in view of Ravi Rungta (US 5362335) and Bamberg et al (US5721057) as applied to claims 11, 14-19, 24-35, 37, 39-40, 43, 45 and 46 and further in view of Xiaoci Maggie Zheng (US 6096381).

Ravi Rungta and others disclose cerium oxide based ceramic coating.

Ravi Rungta does not disclose rough surface in order to have good adhesion.

Zheng discloses plasma spray ceramic coating for thermal barrier in harsh thermal environment and teach that the adhesion mechanism is by mechanical interlocking to a rough surface (Col 1 lines 32-47).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to have an underlying rough surface for good adhesion of ceramic coating.

Response to Amendment

Applicant's arguments filed 1/26/2004 have been fully considered but they are not persuasive.

Applicant argues that in Rungta cerium oxide is not the single largest constituent of the mixed layer and discloses incorporating cerium oxide into and not on an aluminum oxide film. Rungta fails to suggest forming a ceramic layer of cerium oxide on an aluminum substrate

Applicant further argues that JP 083 fails to disclose or suggest a bulk part consisting essentially of a cerium oxide containing ceramic material.

The references of Yuomiko Itou (JP 10004083), Ravi Rungta (US 5362335), Bamberg et al (US5721057), Qian et al (US 6447636), Han et al (US6123791) and Xiaoci Maggie Zheng (US 6096381) basically address the same problem i.e. providing an anti corrosive surface for parts facing harsh thermal environment and teach beyond doubt that the oxides of cerium and other group III elements provide superior protection. The decision to have only a coating or to have bulk part would however have to relate to economy and lifetime desired from the part. Han et al at (Col 2 lines 27-30) teach that ceramic compound added to group III oxide would be

aluminum oxide for being relatively inexpensive and readily available. Prior art has made the fundamental advantage of Group III oxide combined with other ceramic like aluminum oxide abundantly clear for thermal and corrosion resistance. The actual implementation of this teaching in a particular application where specific proportion and thickness may have to be optimized, would have been obvious to one of ordinary skill in the art at the time of invention.

Applicant argues that Qian does not suggest that the top 103 could include an aluminum substrate since it is an insulative ceramic.

Qian discloses both aluminum as well as aluminum oxide (Col 6 lines 1-5) for chamber parts. More over after a coating of ceramic it becomes insulative. Therefore it is not teaching away.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RK

P. Hassanzadeh
Primary Examiner
AU 1763